Trend Study 21-3-03

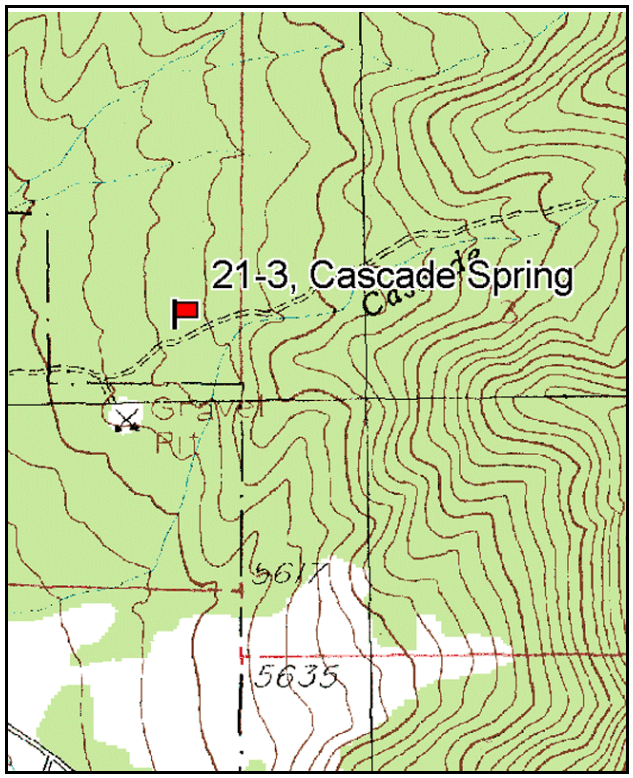
Study site name: Cascade Spring . Vegetation type: Burn-perennial grass .

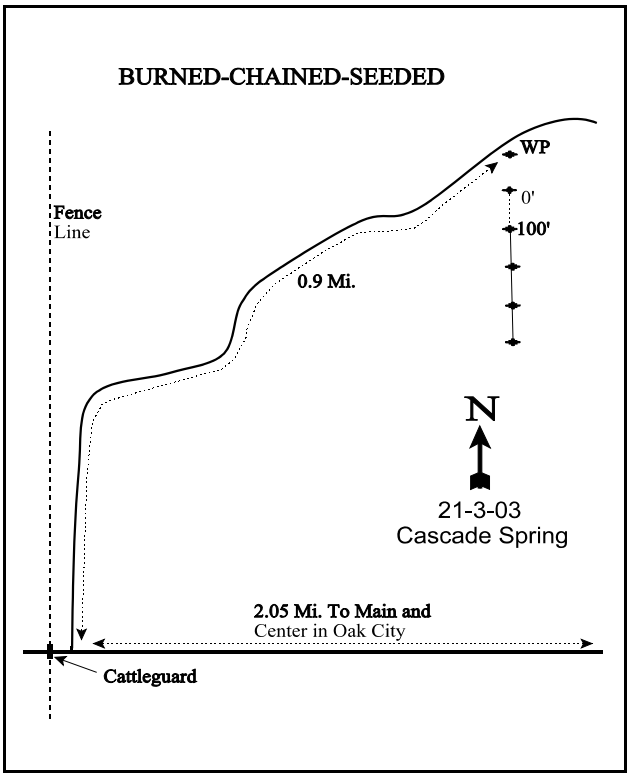
Compass bearing: frequency baseline 180 degrees magnetic.

Frequency belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

LOCATION DESCRIPTION

From Main Street and Center in Oak City, go east on Center 0.35 miles around an "S" bend to an intersection. Stay left and continue 1.7 miles to a cattleguard. Just beyond the cattleguard, turn left up the road to Cascade Spring. Follow this road around several bends for 0.9 miles to a 5/8" rebar 10 feet off the right side of the road. The baseline starts 55 feet true south of this witness post. The 0-foot baseline stake is tagged #7114. The 100-foot end of the baseline is marked by a rebar that is actually only 99 feet south of the 0-foot baseline stake.





Map Name: Oak City South

Diagrammatic Sketch

Township 17S , Range 4W , Section 4

GPS: NAD 27, UTM 12S 4358164 N, 388570 E

DISCUSSION

Cascade Spring - Trend Study No. 21-3

This study is located near the Cascade Spring pellet group transect, 2 miles east of Oak City. The study lies on a southwest facing slope at an elevation of 5,700 feet. The area was burned by wildfire in 1981 and the lower slopes were seeded and chained the following year. The vegetative composition is now dominated by annuals and seeded grasses. As far as the Forest Service is concerned, the project was successful in establishing range suited for cattle. However, this area has limited value for wintering deer due to the lack of browse and thermal cover. Deer use on a nearby DWR pellet group transect averaged 14 days use/acre (35 ddu/ha) between 1985 and 1991 (Jense et al 1991). However between 1993 and 1996, an average of only 3 deer use days/acre (7 ddu/ha) was estimated (Evans et al. 1996). A pellet group transect read parallel to the sampling baseline estimated 12 deer days use/acre (30 ddu/ha) in 1998 and only 3 deer days use/acre (8 ddu/ha) in 2003. Cattle use was high in 1998 at an estimated 62 cow day use/acre (153 cdu/ha), declining to 13 days use/acre (32 cdu/ha) in 2003. A few elk pellets were also sampled on the site in 2003. Identification of grass species was difficult in 1998 due to use by livestock.

The soil is very rocky on the surface and throughout the profile. In some places, it is only 10 to 20 inches to solid limestone bedrock. Effective rooting depth was estimated at just under 11 inches in 1998. Soil texture is a loam with a neutral pH (6.8). Rock and pavement cover are abundant on the soil surface. Soil temperature at 13 inches in depth averaged 73°F in August 1998 and 57.2°F in May 2003. The difference in soil temperature between years is primarily due to the time of sampling and soil moisture. Soil moisture would be much higher in May compared to August on a low elevation site such as Cascade Spring. Erosion was a severe problem on these slopes in the early 1900's, but the wide gully through the study area now supports perennial vegetation. Although erosion increased after the fire, vegetation cover and litter buildup have increased and now give the soil adequate protection. Soils received a stable rating from an erosion condition class assessment done on site in 2003.

No browse was sampled on the transect during the initial reading in 1985. The only browse species encountered in 1991 was a few broom snakeweed (200 plants/acre). Broom snakeweed density increased to 740 plants/acre in 1998 with the entire population being classified as mature. Snakeweed density declined to an estimated 280 plants/acre in 2003 which is expected during drought. Echinocereus and prickly pear cactus are present on the site at an estimated 20 plants/acre in 2003. According to the Forest Service revegetation report, bitterbrush and fourwing saltbush were included in the seed mix, but after more than 20 years post-burn, there are still no preferred browse species on the site. In many places, the herbaceous vegetation appears dense enough to successfully out-compete browse seedlings. In addition, high soil temperatures in late summer months may make it difficult for young shrub seedlings to survive without significant amounts of precipitation. Since there are no seed sources nearby, natural establishment of browse species will take a long time.

Perennial grasses dominate the vegetative community. Seeded grasses including crested (both standard and fairway varieties) and intermediate wheatgrass are established over the whole area. Smooth brome was fairly common initially, but was not sampled on the site in 2003. This is not surprising due to several years of below normal precipitation. This site is marginal for smooth brome anyway. Crested wheatgrass significantly decreased in nested frequency in 2003, while intermediate wheatgrass remained stable. Sandberg bluegrass and bulbous bluegrass are also common with both species significantly increasing in nested frequency in 2003. Cheatgrass is present on site, occurring in scattered thick patches. Cheatgrass has maintained stable frequency and cover values between 1998 and 2003. Forbs are nearly absent and are insignificant on this site. Alfalfa and storksbill were the most common forbs during the initial reading in 1985, but by 2003, forbs were nearly absent. Most of the alfalfa plants were small and almost entirely eaten by grasshoppers in 1985.

1985 APPARENT TREND ASSESSMENT

After the fire and seeding, the area appears to be quickly changing. The percentage of annuals should decrease through time as the perennials become better established. Before the fire, this was an important deer winter range and the lack of browse is a very real problem. Interseeding with browse species should be considered. The soil has stabilized and trend appears to be improving.

1991 TREND ASSESSMENT

Overall, the soil trend is improving. Vegetation and litter cover are increasing while rock, pavement, and bare ground are all slightly decreasing. Browse trend here is not applicable because there are no browse on the site except for broom snakeweed. Herbaceous understory trend is mixed with the grasses doing well and the forbs being nearly absent. The grasses are stabilizing, with some species increasing, while others are decreasing. Overall, they have slightly increased in sum of nested frequency. The major seeded forb, alfalfa, has decreased greatly due to the extended drought. The overall trend for herbaceous understory is stable.

TREND ASSESSMENT
soil - slightly up (4)
browse - no trend, no browse after fire (n/a)
herbaceous understory - stable (3)

1998 TREND ASSESSMENT

Trend for soil is stable with similar ground cover characteristics compared to 1991. There are still no browse species on the site with the exception of broom snakeweed. Trend for the herbaceous understory is up for grasses with a major increase in the sum of nested frequency for perennial grasses. Nested frequency of intermediate wheatgrass nearly tripled. Forbs are represented by only a few Louisiana sagebrush. Livestock utilization of the grasses in 1998 was very heavy (75-85%) making identification difficult.

TREND ASSESSMENT
soil - stable (3)
browse - no trend, no browse after fire (n/a)
herbaceous understory - up for grasses (5)

2003 TREND ASSESSMENT

Trend for soil is stable. Ground cover characteristics show some changes, although they are not significant. Vegetation cover slightly increased between 1998 and 2003, while litter declined. Bare ground only slightly increased between 1998 and 2003. The frequency of perennial grasses also slightly increased in 2003 which is important as herbaceous perennials are a key factor to soil stability. As in previous years, the browse component has no trend. This site has very little use for wintering big game as preferred browse species have been non-existent for more than two decades since the site was rehabilitated following wildfire. The herbaceous understory has a stable trend. Perennials grasses maintained a stable sum of nested frequency value overall, although some species increased and others decreased. Crested wheatgrass significantly decreased in frequency in 2003, while intermediate wheatgrass remained stable. Sandberg bluegrass and bulbous bluegrass both had significantly higher nested frequency values in 2003 compared to the 1998 reading. Cheatgrass brome is moderately abundant on the site, but hasn't increased since the last reading and it appears that the perennials are keeping it in check. Forbs are nearly absent from the site now and will likely never be important on this site.

TREND ASSESSMENT
soil - stable (3)
browse - no trend (n/a)
herbaceous understory - stable (3)

HERBACEOUS TRENDS --
Management unit 21 , Study no: 3

Type	Species	Nested Frequency				Average Cover %	
		'85	'91	'98	'03	'98	'03
G	Agropyron cristatum	$_{b}$111	$_{b}$76	$_{b}$88	$_{a}$36	4.55	1.60
G	Agropyron intermedium	$_{a}$33	$_{b}$73	$_{c}$202	$_{c}$205	11.82	11.61
G	Agropyron spicatum	1	4	-	6	-	.78
G	Bromus inermis	$_{b}$34	$_{b}$32	$_{b}$26	$_{a}$-	.73	-
G	Bromus tectorum (a)	-	-	191	184	5.32	5.44
G	Poa bulbosa	-	8	77	119	4.05	9.20
G	Poa secunda	$_{a}$31	$_{ab}$86	$_{c}$122	$_{d}$182	4.02	7.24
G	Vulpia octoflora (a)	-	-	1	-	.00	-
Total for Annual Grasses		0	0	192	184	5.32	5.44
Total for Perennial Grasses		210	279	515	548	25.18	30.45
Total for Grasses		210	279	707	732	30.51	35.89
F	Artemisia ludoviciana	-	-	4	-	.06	-
F	Convolvulus arvensis	-	-	-	5	-	.06
F	Cymopterus spp.	-	-	-	1	-	.00
F	Erodium cicutarium (a)	54	-	-	-	-	.38
F	Erigeron spp.	$_{b}$13	$_{a}$-	$_{a}$-	$_{a}$-	-	-
F	Lactuca serriola	$_{a}$-	$_{b}$10	$_{a}$-	$_{a}$-	.03	-
F	Medicago sativa	$_{b}$76	$_{a}$4	$_{a}$-	$_{a}$-	-	-
F	Stephanomeria exigua (a)	$_{b}$11	$_{a}$-	$_{a}$-	$_{a}$-	-	-
F	Taraxacum officinale	-	-	-	2	-	.00
F	Tragopogon dubius	-	1	-	-	-	-
F	Unknown forb-annual (a)	-	3	-	-	-	-
F	Unknown forb-perennial	-	4	-	-	-	-
Total for Annual Forbs		65	3	0	0	0	0.37
Total for Perennial Forbs		89	19	4	8	0.09	0.07
Total for Forbs		154	22	4	8	0.09	0.45

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS --
Management unit 21 , Study no: 3

Type	Species	Strip Frequency '98	Strip Frequency '03	Average Cover % '98	Average Cover % '03
B	Echinocereus spp.	1	1	-	-
B	Gutierrezia sarothrae	11	6	.69	.15
B	Opuntia spp.	0	1	-	.03
Total for Browse		12	8	0.69	0.18

CANOPY COVER, LINE INTERCEPT --
Management unit 21 , Study no: 3

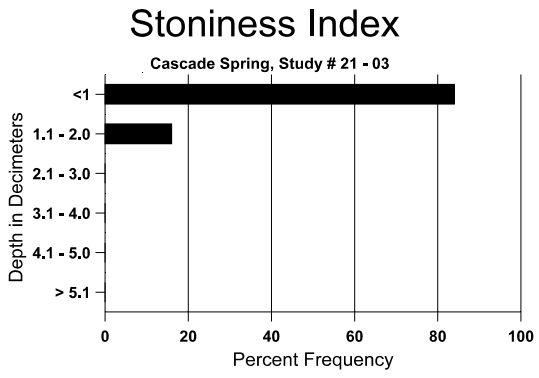
Species	Percent Cover '03
Echinocereus spp.	.05

BASIC COVER --
Management unit 21 , Study no: 3

Cover Type	Average Cover % '85	'91	'98	'03
Vegetation	7.25	10.75	35.95	38.94
Rock	24.25	22.00	14.15	21.33
Pavement	9.00	6.25	3.32	5.62
Litter	40.75	44.00	41.01	29.78
Cryptogams	.75	1.00	.14	.02
Bare Ground	18.00	16.00	16.66	17.68

SOIL ANALYSIS DATA --
Management unit 21, Study no: 3, Study Name: Cascade Spring

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%0M	PPM P	PPM K	ds/m
10.5	57.2 (13.1)	6.8	50.9	29.8	19.3	2.2	13.8	140.8	0.7



PELLET GROUP DATA --
Management unit 21 , Study no: 3

Type	Quadrat Frequency		Days use per acre (ha)	
	'98	'03	'98	'03
Rabbit	5	4	-	-
Elk	-	-	1 (2)	1 (3)
Deer	7	3	12 (30)	3 (8)
Cattle	26	-	62 (153)	13 (32)

BROWSE CHARACTERISTICS --
Management unit 21 , Study no: 3

		Age class distribution (plants per acre)					Utilization				
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% poor vigor	Average Height Crown (in)
Echinocereus spp.											
85	**0**	-	-	-	-	-	0	0	0	0	-/-
91	**0**	-	-	-	-	-	0	0	0	0	-/-
98	**20**	-	-	20	-	-	0	0	0	0	-/-
03	**20**	-	-	-	20	-	0	0	100	100	-/-
Gutierrezia sarothrae											
85	**0**	-	-	-	-	-	0	0	0	0	-/-
91	**200**	-	-	200	-	-	0	0	0	0	10/15
98	**740**	-	-	740	-	100	0	0	0	0	8/15
03	**280**	-	20	180	80	20	0	0	29	29	4/9
Opuntia spp.											
85	**0**	-	-	-	-	-	0	0	-	0	-/-
91	**0**	-	-	-	-	-	0	0	-	0	-/-
98	**0**	-	-	-	-	-	0	0	-	0	-/-
03	**20**	-	-	20	-	-	0	0	-	0	4/5